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Author copy:
Forsythe ME, Whitehouse SL, Dick J, Crawford RW. Functional outcomes following nonrecurrent dislocation of primary total hip arthroplasty. *J Arthroplasty – In press June 2006*

Functional Outcomes Following NonRecurrent Dislocation of Primary Total Hip Arthroplasty

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Abstract
The influence of dislocation on functional outcomes of primary total hip arthroplasty (THA) are unclear. The purpose of this study was to assess the effect of nonrecurrent dislocations treated with closed reduction following primary THA on post-operative outcome in the short to medium term. Ninety-six patients were enrolled in this retrospective case-control study. There were 32 patients who had a postoperative dislocation. The control group consisted of 64 matched patients who did not dislocate. All patients had a minimum of 1 year follow-up. The two groups were compared using the SF-12, reduced WOMAC and satisfaction questionnaire. There was no statistical difference between the two groups in terms of subjective functional outcomes using the WOMAC or SF-12. However, there was a trend towards better quality of life scores in the control group and they were more satisfied with their surgery compared to the dislocation group.

Running head: Outcomes following dislocation of THA

Key words: total hip arthroplasty, nonrecurrent dislocation, outcome

Introduction:
Dislocation of primary total hip arthroplasty (THA) is a serious possible complication that occurs in approximately 0.4 - 3.9% of postoperative patients (1). The reasons for total hip arthroplasty dislocation are multifactorial and include both surgical and patient related factors. Surgical factors include: approach, component positioning, soft tissue tension, implant geometry, head size and surgeon experience. Several studies have reported on the causes (2-7), incidence (1, 8-14), prevention (15, 16) and management (17, 18) of dislocation after primary THA.

Patient related factors responsible for THA dislocation are many and varied. Women have a 2-3 times higher rate of dislocation in two large series possibly due to increased tissue compliance and range of motion (17). Older patients are more likely to dislocate (19, 20) due to diminishing proprioception, co-ordination, and soft tissue quality. They also have an increased frequency of falls, confusion and decreased ability to comply with physical restrictions imposed post operatively. Age alone has not been conclusively determined as an independent risk factor because of the confounding variables noted above. No correlations have been made between other patient characteristics and risk of dislocation. THA performed for subcapital hip fracture is associated with a higher rate of dislocation (10% at the Mayo clinic compared with 2.4% overall rate of dislocation) (14).

Joshi et al (1) reviewed patients with dislocation following Charnley THA at Wrightington Hospital, Lancashire with the aim of assessing the fate of the THA following dislocation. Eighty-four percent of dislocations were single and 16% became recurrent. Eighty-one percent were treated successfully with closed reduction. Of the dislocated THA, 36% occurred in patients who had undergone previous hip surgery and trochanteric non-union was present in 47%. All recurrent dislocators required further surgery. A recent review article reported that between 3-6% of dislocations are not reducible by closed means and require open reduction. They also reported recurrent dislocation in between 16% to 33% of patients that required further surgery. Therefore the majority of dislocators (nonrecurrent) can be successfully treated with closed reduction with or without a brace (14).

To date there are no studies examining the influence of dislocation on functional outcomes of primary total hip arthroplasty. This is important as surgeons are currently unable to counsel patients on what functional outcome they can expect following a dislocation. The purpose of this study was to assess the effect of nonrecurrent (once or twice) dislocations treated with closed reduction following primary total hip arthroplasty on post-operative satisfaction, functional level and perceived level of pain in the short to medium term.

Materials and Methods:
After appropriate ethics committee approval and informed consent, 96 patients were enrolled in this retrospective case-control study. All patients have previously undergone primary total hip arthroplasty using various implant designs and surgical approaches.

The use of both generic and disease specific outcome measures has been strongly advocated (21, 22) for use following joint replacement. More recent studies (23, 24) specifically recommend the use of the SF-36 (25) and the WOMAC (26). Since these have both been successfully reduced (27, 28) and in order to reduce respondent burden, these shortened versions were utilized in this study. SF-12 scores are calculated using norm based scoring (29) (mean 50, standard deviation 10) and reported for physical and mental dimensions on a 0-100 scale worst to best. The WOMAC is designed to capture the essential elements of pain and physical function in patients with osteoarthritis of the hip and knee, and has been validated for use following total joint replacement (30). Reduced WOMAC scores are reported on a 0-48 scale, best to worst. Each item has five possible response categories – none (0), mild (1), moderate (2), severe (3) and extreme (4). Items are summated to calculate and an overall score which is on a 0-48 scale, best to worst. A satisfaction score was also used which assesses patient satisfaction with outcome following hip or knee arthroplasty. The score consisted of four questions including satisfaction with pain relief, improvement in function for home/yard work, improvement in function for recreational activity as well as overall ability of the surgery to meet expectations and are each scored on a five point Likert scale from poor to excellent and transformed to a 0-100, worst to best scale. In general, a score of less than 50 can be interpreted as a patient being dissatisfied, and 50 or above as being satisfied (31).

All patients have had a minimum of 1 year follow-up. All patients were mailed a package of questionnaires including a generic health questionnaire (SF-12), disease specific questionnaire (reduced WOMAC) and overall satisfaction questionnaire as well as specific questions regarding complication rates (should they have attended a different hospital or not reported an event at follow-up) and whether they would have the operation again. A self-addressed return envelope was also included.

In order to detect a 15% difference in reduced WOMAC score (deemed to be a clinically significant difference), power analysis identified that 29 patients per group would be required. We identified 40 patients with dislocations at our institution in the last 9 years. Upon further chart review, 7 of these pts had undergone revision surgery and were excluded and one patient was lost to followup. Therefore, the case group consisted of 32 patients who have had a postoperative dislocation (8 had 2 dislocations, 1 had 3) as noted on routine clinical follow-up using the Orthowave database.

The control group consisted of 64 age and gender matched patients who have undergone routine total hip arthroplasty and have not had a dislocation recorded on routine clinical follow-up. All patients were specifically asked whether they have had a dislocation on mailed out questionnaires.

Statistical analyses were performed to compare the two groups using SPSS software (SPSS Inc, Chicago IL). All outcomes, except for the satisfaction scores, were analysed using non parametric tests (Mann-Whitney U-tests and

chi-squared test for frequencies) following Normality testing. Satisfaction scores were Normally distributed and were analysed using the t-test.

Results:

Patient Demographics

A total of 96 patients who underwent total hip replacement were contacted. Of these, 32 patients had suffered nonrecurrent postoperative dislocations and were compared to 64 control patients who did not dislocate postoperatively. Age and sex matching was confirmed. Fourteen males (44%) and 18 females were in the dislocation group compared to 28 males (44%) and 36 females in the control group (not significant p=0.87). Mean age was 69.3 years (SD 13.1) in the dislocation group and 69.7 years (SD 11.1) in the control group (not significant p=0.64). The median length of follow up was 1.8 years (inter quartile range 1.4) in the dislocation group and 1.9 years (IQR 1.9) in the control group. In the dislocation group, the median time to dislocation was 25.5 days (IQR 66) and the median time from dislocation to follow up was 1.7 years (IQR 1.6).

Outcomes

WOMAC scores showed no significant difference between patients with or without dislocations (p=0.78). The median reduced WOMAC scores in the dislocation group was 11.5 (IQR 16) and 10.0 (IRQ 15) in the control group. Scores of this magnitude indicate an average response of ‘mild’ for most items in both the pain and function dimensions.

SF-12 scores showed no significant statistical difference between the two groups (p=0.81 mental and p=0.33 physical). However, there was a trend for lower scores in the dislocation group which did not reach statistical significance. The median mental score for the dislocation group was 55.1 (IQR 15.2) and 57.7 (IQR 16.5) for the control group indicating that both groups are scoring slightly better than average following surgery. The median physical score for the dislocation group was 33.6 (IQR 14.0) and 37.2 (IQR 15.6) for the control group, indicating that they were scoring less than the general population norm.

Patient Satisfaction

There was a statistically significant difference between the patients with and without dislocations (p=0.03) for satisfaction scores. The mean satisfaction score for the dislocation group was 51.4 (SD 28.1) and 63.7 (SD 20.4) for the control group.

Patients were also asked if they would have the surgery again if required. Fifty-seven percent of patients in the dislocation group would definitely have a total hip replacement again compared to 63% in the control group, which was not significant when compared using the chi-squared test (p=0.48).

Discussion

This study was performed to identify any patient perceived difference in outcome if patients suffered a nonrecurrent postoperative dislocation treated with closed reduction compared to patients who had not suffered a

dislocation. This is important as surgeons are currently unable to counsel patients on what functional outcome they can expect following a dislocation. We chose the reduced WOMAC and SF-12 as there are both validated quality of life outcome questionnaires that can be administered by mail. The WOMAC is a disease specific questionnaire while the SF-12 is a general health survey with both physical and mental components. Both scores showed trends toward better outcome if the patient did not have a dislocation but this was not statistically significant.

Furthermore, patients who suffered a dislocation reported significantly poorer results when asked specific questions regarding their satisfaction in terms of pain relief, return to regular activity, sports and whether their expectations were met. Most patients who suffer a dislocation are either instructed to or simply avoid activities and positions that may provoke a dislocation. These restrictions placed on the patient are more important immediately after the dislocation and over time they are less important and adhered to. Therefore, the return to activity will be slower and perhaps not even completely fulfilled depending on their preoperative level of function. Longer follow up may allow for more normal return of function in patients who dislocate as the soft tissues scar in and stabilize the joint, allowing the restrictions to be lifted. This slower return to function will have a negative psychological impact on the patient that decreases their satisfaction with the index operation and they are less likely to undergo the operation again as was proven by our results.

This study reports only on the short-term outcomes of nonrecurrent dislocation of the hip. Within two years, patients who dislocate have slightly worse outcomes as those who do not dislocate in terms of overall health and disease specific quality of life. When asked specifically about satisfaction of the involved hip and its effect on quality of life, patients who had a dislocation reported significantly worse outcomes. This study focuses on those patients who dislocate once or twice and have a successful closed reduction. There may be some patients in this study who would become recurrent dislocators at longer follow up, but these early results are important. They allow orthopaedic surgeons to inform patients that if they have a dislocation successfully treated with a closed reduction, that in the short term they will physically recover but they will be less satisfied than if they did not suffer a dislocation. This is the first such report in the literature as most others look at dislocation risk and the treatment of recurrent dislocations.

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